# Research Needs

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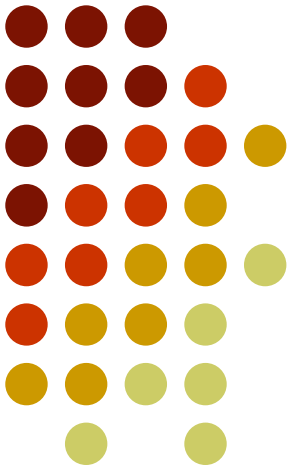
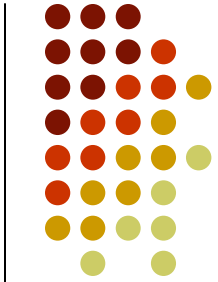
EPA Centers Meeting
Washington DC, September 27, 2004



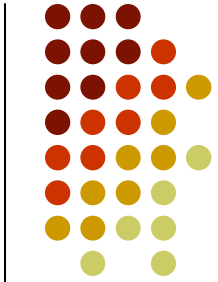
# Research Needs



I will focus on two research needs:

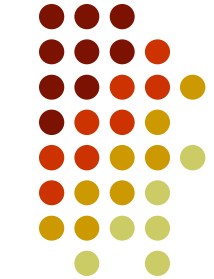
- Assessment of human exposures to PM components and;
- Identification of PM toxic components

# Outdoor Measures Versus Actual Human Exposures



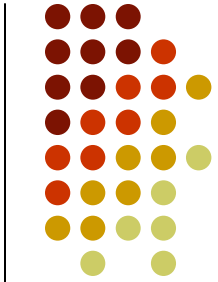
- High correlations for fine mass and sulfates
- Weak correlations for coarse and ultrafine particles and black carbon
- Human exposures/outdoor concentration relationships depend on home ventilation rates and vary by city and season

# Continue Research on PM Exposure Assessment



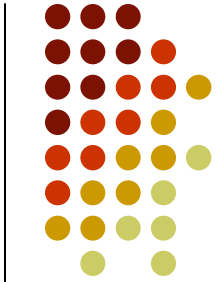
- Assess human exposures to fine, coarse and ultrafine particles and their components as they relate exposures to specific sources
- Focus on susceptible subpopulations
- Investigate differences among cities

# Identify Toxic Components/ Sources



- Conventional Epidemiological Studies -- Challenges
  - Particles are internal mixtures
  - Components are correlated
  - Co-pollutants are present
  - Sources are spatially mixed
  - More than one silver bullet may exist

# Accomplishments

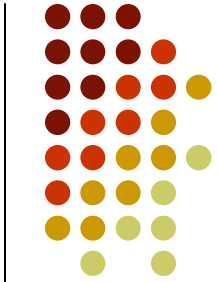


- A large spectrum of cardiopulmonary and respiratory outcomes have been associated with particle exposures
- A number of susceptible subpopulations have been identified
- Toxicological and exposure assessment studies have been very useful in our efforts to validate epidemiological studies

# Use Available Biological, Exposure and Statistical of Tools

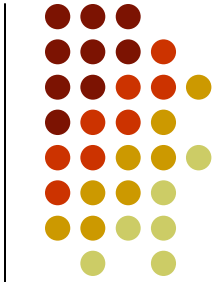
- Conduct studies that address specific hypothesis regarding different sources/ components by creating the appropriate exposure scenarios

# Population Studies



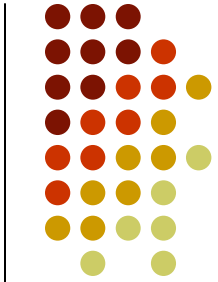
- Multiple Cities
  - Particle toxicity versus composition (e.g. LA vs NY)
  - Exposures and climatic differences (e.g. home ventilation, penetration of sulfate vs nitrate)
- Single City
  - Toxicity of specific sources (e.g. individuals living at different distances from roads)
  - Particles and gaseous co-pollutant concentrations may be correlated

# Panel Studies



- Patrolmen study (highway exposures)
- Bus study (city traffic exposures)

# Controlled Exposures



- Source particles (e.g. diesel, wood burning, secondary particles of a specific source)
- Concentrated ambient particles (e.g. fine vs coarse vs ultrafine)